EDMS 5.0 Release Notes

January 29, 2007

EDMS 5.0 provides a number of major new capabilities compared to EDMS 4.5. This document provides a summary of the major changes between EDMS 4.5 and EDMS 5.0. Further information about the new modeling options can be found in the EDMS 5.0 User's Manual.

1 Study & Overall Modeling Changes

1.1 Multiple Scenarios, Airports, Years

Studies can now contain multiple scenarios, multiple airports and multiple years. Whatever airports are included in the study are included in every scenario, however airport details, such as runway layout, can vary from scenario to scenario within the study. Furthermore, for each scenario-airport combination the operational usage of the emissions sources can change from year to year. Refer to Section 1.3.3 Structure of an EDMS Study of the EDMS User's Manual for more information.

1.2 Dispersion Modeling Options Available for Emissions Inventory

The concept of the "emissions only" and "emissions and dispersion" modes has changed. The emissions inventory is able to use the exact same data as the dispersion analysis. This includes the ability to model configuration changes and queuing in conjunction with meteorological data. Therefore, if the AERMET wizard is run, these meteorological conditions will be applied to the emissions inventory.

EDMS now gives the choice of whether or not to have "dispersion enabled". When dispersion is enabled, it requires certain other options to be selected: dynamic performance-based aircraft modeling (in-air and runway movement), sequence modeling (for taxi times), and hourly weather data. If those same options are selected when dispersion is not enabled, the results of the emissions inventory will be exactly the same as they are with dispersion enabled. Sections 1.3.2 and 1.3.4 of the EDMS User's Manual give a good overview about these options, and Sections 2.2 and 3.1 give detailed descriptions.

Supporting this has changed the functional flow through EDMS. For example, the weather option must be handled before an emissions inventory can be run. The new procedures for emissions inventories and dispersion analyses are explained in Sections 1.3.6 and 1.3.7 of the EDMS User's Manual.

1.3 Operational Profiles

Operational profiles must be defined in 15-minute (quarter-hour) bins, as opposed to the hourly bins used in EDMS 3.X and 4.X. This is to support more precise aircraft delay and sequence modeling. As a consequence of this change the peak hour fields have been changed to peak quarter hour.

Studies converted from EDMS 4.5 have their peak hour values divided by 4 to give the peak quarter hour in EDMS 5.0. Similarly, users who have peak hour data for their 5.0 study should divide by 4 before entering as a peak quarter hour.

1.4 Menu Items

In conjunction with the new EDMS 5.0 architecture, there has been some reorganization of the menus.

Changes to the Study Setup dialog in EDMS 4.5:

1. Mixing Height and the AERMET wizard have moved to a new Weather dialog, which is found under the Airport menu header. The weather dialog also displays and allows to be edited various annual average weather parameters.
2. The contents of the Domain tab of the Study Setup dialog have moved to the Run AERMAP dialog. The fields for naming the .REC and .SRC files have been removed to accommodate the use of multiple scenarios and airports.
3. Options for the Aircraft Times in Mode have been moved from Study Setup to the Scenario Properties dialog.
4. The option to specify the desired MOBILE model as well as the option to select the GSE modeling basis have been removed. EDMS 5.0 uses only MOBILE 6.2 and permits both GSE assignment and GSE population within the same scenario.
5. The *Study Type* has been replaced with the *Enable Dispersion* checkbox on the new Study Properties dialog.
6. Airport information from the Study Setup dialog’s General tab has moved to the Airport Properties dialog.
7. The Units of Measure tab of the Study Setup dialog is now part of the Study Properties dialog.

Changes to other dialogs:

8. The Operational Profiles menu item has moved from under the *File* menu to the *Utilities* menu.
9. The Configurations dialog has moved from under the *Dispersion* menu header to the *Airport* menu header, since these can now be used without dispersion as well.
10. The Taxiway Assignment tab of the Configurations dialog is gone, as taxiway usage is now computed automatically.
11. Import and Export have moved from under the *Utilities* menu header to the *File* menu header.
12. Runway queues are now computed dynamically by the sequencing model, and so are not needed on the Runways dialog.
13. The Aircraft Operations & Assignments tabs have been completely reorganized with many additions and deletions due to the major modeling changes involving aircraft.

1.5 Saving Study

The study data are not saved automatically. In previous versions of EDMS, pressing “OK” in any dialog stored the data directly into the study tables on disk. In EDMS 5.0, open study is loaded into the computer memory, and the user must explicitly “save” the data to disk, by pressing control-S, selecting Save from the File menu, or pressing the save icon on the toolbar. This will allow you to revert to the last saved version of your file, if you should make an error while entering data. However, updating the emissions inventory will automatically save the study data upon completion of the emissions calculations.

2 Emissions Modeling

Updating emissions will calculate emissions for all scenarios, airports, and analysis years. In addition, if Dispersion is enabled, the HRE hourly emissions files will be generated for all pollutants at the same time as emissions is updated, which could take some time. Selecting “Run AERMOD” from the Dispersion menu will run AERMOD for all analysis years for the selected scenario and airport.

2.1 Emissions Module

The emissions module is used to compute aircraft emissions dynamically based on performance parameters and weather conditions. When hourly weather data is being used, emissions are computed for each aircraft operation individually.

2.2 Particulate Matter

The First Order Approximation 2.0 (FOA2) used in EDMS 4.5 estimated the volatile fraction of particulate matter using just a scalar applied to the non-volatile fraction. EDMS 5.0 uses FOA3, which predicts the volatile PM from secondary PM drivers, namely Sulfur conversion chemistry and condensed organic gases.

3 Dispersion Modeling

The process for conducting a dispersion analysis has changed, mainly to support the ability for an emissions inventory to use the same modeling options and produce the same results as the emissions that is actually dispersed. For a more detail explanation of the changes, see Sections 1.3.6 and 1.3.7 of the EDMS User’s Manual.

Dispersion is now performed on all mass emissions up to the mixing height (no longer just to 1,000 feet above ground level). To avoid a significant runtime penalty, emissions from 1,000 feet to the mixing height are collapsed to a series of area sources at the midpoint between the two altitudes.

4 Airports

The aircraft-related settings for the airport layout can now be used for emissions inventory also, not just dispersion.

4.1 Airports Database

The Airports Database has been completely redesigned with the addition of about 10,000 more airports (nearly 35,000 total airports worldwide). The airports database is now common to the Integrated Noise Model, and also includes average annual weather data for many US airports.

4.2 Weather

There is a new weather dialog that allows the user to choose between annual average or hourly weather when dispersion is not enabled. The user can also set the mixing height here and when selected, modify the annual average values. The AERMET wizard is launched from this dialog.

EDMS now uses a third AERMET file in addition to the surface (.SFC) and profile (PFL) files that were used in 4.5. The third file, the AERMET surface observation file (SFQAFILE.MET), is an intermediate file output by AERMET, which retains all of the meteorological parameters that were originally contained in the user-supplied surface data file. EDMS directly reads that file to get the hourly weather, which directly affects aircraft performance (when dynamic performance-based modeling is used), aircraft emissions, and the selection of the active airport configuration. The airport configuration, in turn, affects sequence modeling (taxi times) and runway usage.

In EDMS 4.5, the average daily high and low temperatures were set to the average daily temperature ±10.35 °F. In EDMS 5.0, they default to those same values, but can be edited by the user. Altering these values will affect the vehicle emissions results from MOBILE.

Weather is discussed in detail in Section 3.1 of the EDMS User's Manual.

4.3 Taxiways & Taxipaths

The definition of taxiways is significantly simpler in EDMS 5.0 than in EDMS 4.5, since they can consist of multiple segments. The user may now choose from 2 to 20 points (1 to 19 segments) for each taxiway. Another difference for Taxiways is the addition of elevation. See Section 4.1.2 of the User's Manual for more information on elevation, and to Section 6.4.4 for taxiways.

Taxipaths are a new concept for EDMS 5.0. This is the set of taxiways that are used to link aircraft with gates and runway ends. To define a taxipath, the set of taxiways for the airport must first be defined. See Section 6.4.6 of the User's Manual for more information on Taxipaths.

4.4 Runways

Runways in EDMS 5.0 no longer have a queue. Queuing delay is computed by the sequencing model, and the delayed aircraft back up along the taxiways defined in their taxipath. Runways are not necessarily perfectly level; an elevation can be entered for each runway end. Also a glide slope can be assigned to each runway end that will be used when the Use Runway Glide Slope checkbox is checked on the Performance tab of the Aircraft Operations & Assignments dialog. See section 6.4.5 of the User's Manual for more details about runways.

4.5 Runway Configurations

The Configurations dialog has been significantly improved, most notably with the addition of airport capacity information, which is used to determine aircraft delays. Also, in addition to wind direction and speed used in EDMS 4.5, EDMS 5.0 also uses hour of the day, ceiling, visibility and temperature as activation parameters to determine which configuration is active. Taxiway assignments are no longer needed, as taxiway usage is determined by the sequencing model. Also, aircraft are no longer directly assigned to runways, since the runway configurations will determine the runway assigned to each aircraft operation.

The user can also require specific configurations to be used for a fixed percentage of the time, and EDMS will match the required percentages, while trying to satisfy the wind direction activation requirements as well as possible. See Section 6.4.7 of the EDMS User's Manual for details of how to use the configurations.

5 Aircraft

5.1 Aircraft Fleet

The EDMS system table CONV45_5.DBF found in SYS_DATA\Fleet\Common in the installation directory contains all aircraft mappings from EDMS 4.5 to EDMS 5.0. All aircraft from EDMS 4.5 appear in EDMS 5.0 except for the Alpha 70 and the MIG-18-50 which are no longer supported. In addition to the EDMS 4.5 aircraft, EDMS 5.0 now contains several new aircrafts, found in Appendix A. In EDMS 4.5 each aircraft was identified using an AIR_NAME, and each engine using an ENG_UID. In EDMS 5.0, each aircraft is identified by an ACCODE, which is a unique alphanumeric identifier based on BACK aircraft types. Similarly, each engine is identified by a UID, which a unique alphanumeric engine identifier based on ICAO UID.

The fleet database is now common to the Integrated Noise Model, which aides in the future integration of the two tools.

5.2 Dynamic Flight Performance Modeling

EDMS 5.0 has a dynamic flight performance module that provides flight path, timing and fuel burn dependent on specifics such as weather, and individual aircraft and engine characteristics. The dynamic flight profile generator is based on SAE 1845 and BADA performance, and can compute profiles for all EDMS aircraft, including helicopters.

5.2.1 Flight Profile Performance Data

In EDMS 4.5, the takeoff portion of a departure was assumed to end at 1,000 feet. With the dynamic flight performance module, the transition from takeoff to climb out is now variable, depending on aircraft performance characteristics and weather.

5.2.2 Usage of Weather Data

In EDMS 4.5, the emissions calculations using both the ICAO Times In Mode and Performance-Based modeling assumed the standard day weather conditions and was read from a table. In EDMS 5.0 actual available weather (either annual average values or hourly values) is used for both ICAO Times In Mode and performance-based modeling.

If hourly weather data is being used with performance-based aircraft modeling, EDMS 5.0 will compute a distinct profile for every aircraft operation. If the airport's annual average weather is being used, all profiles for each aircraft-engine combination would be the same throughout the year, so EDMS computes the profile just once for each aircraft type.

5.3 Aircraft Schedule

In lieu of using operational profiles, historic aircraft scheduling information can be used to feed the sequencing model. Details about using a schedule file can be found in the EDMS User's Manual, Section 6.3.1.2.

5.4 Delay & Sequence Modeling

More detailed modeling of aircraft movement on the ground gives more accurate estimates of taxi times and location of emissions for dispersion. The model uses a modification of the WWLMINET' Airport model to determine overall delays for each our based on the provided airport capacity. In addition, the Delay & Sequencing Model uses airport layout information such as gates, runways, taxiways, taxipaths, and configurations as well as scheduling information to compute the ground movement of aircraft.

5.5 Emissions Calculations

An emissions module provides more precise emissions for aircraft based on the results of the performance module. The emissions module uses Boeing Fuel Flow Method 2 to scale emissions for a continuous range of weather conditions, rather than just standard atmospheric conditions.

5.6 Aircraft Main Engine Startup

Aircraft main engine startup emission is now also modeled, and is reported in its own "Startup" aircraft mode of operation, and is attributed to the AERMOD gate source to which the aircraft is assigned.

5.7 Modes of Operation

In EDMS 4.5, there were 4 aircraft modes of operation: Approach, Idle, Takeoff, and Climb Out. EDMS 5.0 allows the user to not only specify LTO cycles, but also separate arrivals and departures, with independent numbers of operations. So, the Idle mode has been separated into Taxi In and Taxi Out modes. In addition, a Startup mode has been added for aircraft main engine startup. For more information on the new 6 aircraft modes of operation in EDMS 5.0, please see Section 2.2 Aircraft Activity of the EDMS User's Manual.

6 Non-Aircraft Sources

6.1 GSE Modeling Differences

Assigning GSE to aircraft and using GSE population are no longer mutually exclusive; both can be used in the same study.

The GSE_EF and NORNROAD tables, which contain emission factors for the GSEs have been updated based on values from EPA's NONROAD 2005. GSE_EF contains the emission factors used when Use default age distribution is selected, and NONROAD contains the emission factors used when Specify a specific age is selected in the GSE Population dialog.

6.2 Parking Facilities Modeling Differences

EDMS 5.0 uses only MOBILE 6.2 for emissions factors computation, while EDMS 4.5 allowed the option to use either MOBILE 5a, 5b, and 6.2. The MOBILE model is affected by the weather, so check Section 1.1 of the release notes for more information on weather related changes.

The only other difference between EDMS 4.5 and 5.0 for Parking Facilities is the addition of elevation. See Section 4.1.2 of the User's Manual for more information on elevation.

6.3 Roadways Modeling Differences

A single roadway can now be composed of multiple segments. In addition, the fleet mix for that roadway can be defined, without having to duplicate the roadway as with EDMS 4.X. Also, Emissions for Roadways in EDMS 4.5 were automatically doubled to model round-trip. In EDMS 5.0, Roadways emissions are not doubled.

The number of vehicles in 4.5 has been replaced with traffic volume, which is the total number of vehicle traversals on the road.

The round-trip distance in 4.5 has been replaced with roadway length and emissions for roadways are generated as though they are one-way operations.

Note: In order to model a EDMS 4.5 roadway in EDMS 5.0, the user must use half of the round-trip distance as roadway length, and double the yearly number of vehicles for yearly traffic volume.

EDMS 5.0 uses only MOBILE 6.2 for emissions factors computation, while EDMS 4.5 allowed the option to use either MOBILE 5a, 5b, and 6.2. The MOBILE model is affected by the weather, so check Section 1.1 of the release notes for more information on weather related changes.

6.4 Stationary Sources

New aircraft engines were added for aircraft engine testing. There are no modeling differences between EDMS 4.5 and 5.0 Stationary Sources.

6.5 Training Fires

There are no modeling differences between EDMS 4.5 and 5.0 for Training Fires, except for the addition of elevation. See Section 4.1.2 of the User's Manual for more information on elevation.

6.6 Gates

In addition to all modeling inputs of EDMS 4.5, EDMS 5.0 adds elevation and the dispersion parameters Initial Sigma-Z and Initial Sigma-Y. See Section 4.1.2 of the User's Manual for more information on elevation and to Section 6.4.3 for more information on the dispersion parameters Initial Sigma-Z and Initial Sigma-Y.

7 Other Changes

7.1 AERC Report

The Airport Emissions Reduction Credit (AERC) report is now part of EDMS, rather than being an external application. The AERC report can be generated within EDMS 5.0 by selecting AERC Report from the View menu. See Section 6.6.2 of the User's Manual for more information on how to select the baseline scenario and generate an AERC report.

7.2 Study Import/Export

The text file generated from the Study Export, which is also used for Study Import, is now delimited by a semicolon rather than comma.

8 EDMS 4.5 to EDMS 5.0 Study Conversion

EDMS 5.0 will support studies last saved in the EDMS 4.5 study format. To open studies saved in older versions of EDMS, the user will need to open and save the study using EDMS 4.5 first; then open the study using EDMS 5.0. The study conversion will not alter original data, but will instead retrieve information from the original study and save it in a new location. The user will then be prompted to provide the new location and name for the study.

EDMS 4.5 studies for computing Emissions only, will be fully converted, and the user will be able to update emissions once the conversion is finished. Studies that have dispersion enabled, however, will require the user to provide additional information before being able to update emissions.

The following list shows the EDMS 4.5 data that will not be converted due to the modeling differences in EDMS 5.0:

- The Study Setup dialog:
    - GSE modeling base selection
    - Mobile model selection
- The Aircraft dialog:
    - Runway assignments
    - Taxiway assignments
- The Runway and Queues dialog:
    - The queue information will not be used (this includes its location, the Peak Queue Time and the Queue Hourly Profiles)
- The Runway/Taxiway Configurations dialog:
    - Data provided in the Taxiway Assignment tab
- The Receptors dialog:
    - Polar receptors for which the Origin Source is a Queue

Typically, the conversion maps the EDMS 4.5 data into EDMS 5.0 without making any changes. For the following items, however, the EDMS study conversion will automatically perform the following operations:

- The Roadways dialog:
    - The Round-Trip Distance is divided by 2 to get the Roadway Length
    - The Number of vehicles is doubled since each operation represents a vehicle traversing the roadway once (not a round trip as it was in EDMS 4.5).
- The Operational profiles dialog:
    - Hourly profiles are converted into quarter-hourly profiles. Furthermore, “Per Peak Hour” data are converted into “Peak Qtr Hour” in all dialogs.
- Assign default values for all modeling inputs that are new in EDMS 5.0 and which were not available in EDMS 4.5 (e.g. elevation in the Runways, Taxiways, Roadways dialogs, and capacity in the Configuration dialog).

Once the conversion is finished, studies with dispersion enabled require the user to provide the following additional information before being able to update emissions:

- Define Taxipaths
- Provide proper settings for Runway Configurations

<u>Note:</u> None of the results from previous emissions and dispersion runs will be converted and the user will not be able to view the results of completed runs, including the Emissions Inventory, AERC report or Concentrations without first updating emissions.

Appendix A. New Aircraft

The following list shows the 220 aircraft that are new in EDMS 5.0. Refer to the system tables located in SYS_DATA\Fleet\Common for more information on these aircrafts.

Aviat Husky A1B
Airbus A300B2-300 Series
Airbus A300F4-600ST Beluga
Airbus A319-100 X/LR
Airbus A321-200 Series
Airbus A340-500 Series
Airbus A380-100 Series
Airbus A380-200 Series
Airbus A380-800
Boeing Stearman PT-17 / A75N1
Aerostar PA-60
Antonov 12 Cub
Antonov 124 Ruslan
Antonov 140
Antonov 24 Coke
Antonov 26 Curl
Antonov 30 Clank
Antonov 32 Cline
Air Tractor AT-502A
Air Tractor AT-502B
Air Tractor 802
ATR 42-300
ATR 42-320
Avro RJ-100
Avro RJ-70
Avro RJ-85
Boeing Business Jet (BBJ)
Boeing Business Jet II
Boeing 747-400 ER
Boeing 767-400
Boeing 777-300 ER
BAC 1-11 475
BAC 1-11 500
BAE 146-100QT Quiet Trader
BAE 146-200QT Quiet Trader
BAE 146-300QT Quiet Trader
Raytheon Beech 18
Raytheon Beech 1900-D
Raytheon Beech Bonanza 36
Raytheon Beech 55 Baron
Raytheon Beech Baron 58
Raytheon Beech 60 Duke
Britten-Norman BN-2 Islander
Britten-Norman BN-2A Mk III Trislander
CASA 212-100 Series
CASA 212-200 Series
CASA 212-300 Series
CASA 212-400 Series
CASA 295
Bombardier CL-415
Bombardier Challenger 300
Bombardier Challenger 602
CASA CN-235-100
CASA CN-235-300
Cessna 182
Cessna 206
Cessna 210 Centurion
Cessna 310
Cessna 340
Cessna 402
Cessna 404 Titan II
Cessna 414
Cessna 421 Golden Eagle
Cessna 425 Conquest I
Cessna 525 CitationJet
Cessna 560 Citation Excel
Cessna 560 Citation XLS
Rockwell Commander 500
Rockwell Commander 680
Rockwell Commander 690
Convair CV-440
Convair CV-580
Raytheon Beech D17S Staggerwing
Boeing DC-3
Boeing DC-6
DeHavilland DHC-2 Mk III Beaver
DeHavilland DHC-3 Otter
DeHavilland DHC-6-200 Twin Otter
DeHavilland DHC-8-100
DeHavilland DHC-8-200
DeHavilland DHC-8-300
Dornier 128 Skyservant
Dornier 228-100 Series
Dornier 228-200 Series
Embraer 312 Tucano
Embraer ERJ135
Embraer ERJ135-ER
Embraer ERJ135-LR
Embraer ERJ145-ER
Embraer ERJ175
Embraer ERJ175-LR
Embraer ERJ190
Embraer ERJ190-LR
Embraer ERJ195
Embraer ERJ195-LR
Fokker F27-100 Series
Fokker F27-200 Series
Fokker F27-300 Series
Fokker F27-400 Series
Fokker F27-500 Series
Fokker F27-600 Series
Fokker F27-700 Series
Dassault Falcon 10
Dassault Falcon 200
Dassault Falcon 2000
Dassault Falcon 20-D
Dassault Falcon 20-E
Dassault Falcon 20-F
Dassault Falcon 20-G
Dassault Falcon 50-EX
Dassault Falcon 900
Dassault Falcon 900-B
Dassault Falcon 900-C
Dassault Falcon 900-EX
Grumman G-21G Goose
Grumman G-73 Mallard
Gulfstream G100
Gulfstream G150
Gulfstream II-B
Gulfstream II-SP
Gulfstream G350
Gulfstream IV-SP
Hawker HS-125 Series 1
Hawker HS-125 Series 3
Hawker HS-125 Series 400
Hawker HS-125 Series 600
Raytheon Hawker 800
Hawker HS748-1
Hawker HS748-2
Israel IAI-1121 Commodore
Israel IAI-1123
Israel IAI-1125 Astra

Israel IAI-1126 Galaxy
Ilyushin 18 Clam
BAE Jetstream 32-EP
Lockheed L-1329 Jetstar II
BAE Jetstream 1
BAE Jetstream 200 Series
Let 410
Let 410-UVP
Let 420 Tubolet
Lancair 360
Bombardier Learjet 23
Bombardier Learjet 24-XR
Bombardier Learjet 25-XR
Bombardier Learjet 28
Bombardier Learjet 29
Bombardier Learjet 36
Bombardier Learjet 40
Bombardier Learjet 45
Bombardier Learjet 45-XR
Bombardier Learjet 55
Bombardier Learjet 60
Maule MT-7-235
Boeing MD-10-30
Boeing MD-11-ER
C-26A
Boeing F-15E Strike Eagle
Hawker Hunter
Rockwell 1121 Jet Commander
Rockwell 1121A Jet Commander-A
Rockwell 1121B Jet Commander-B
Lockheed P-3 Orion
Grumman S-2E Tracker
T-38 Talon
Fairchild Metro IVC
Mooney M20-K
Mitsubishi MU-2
Ryan Navion B
Ryan Navion F
Nord Transall C-160
Piaggio P-166
Piaggio P.180 Avanti
Partenavia P.68 Victor
Piper PA-27 Aztec
Piper PA-34 Seneca
Piper PA46-TP Meridian
Pilatus PC-12
Pilatus Turbo Trainer PC-9
Raytheon Premier I
Rans S7S
Reims-Cessna 406 Caravan II
Fairchild SA-26-T Merlin II
Saab 2000
Saab 340-B
Rockwell Sabreliner 40
Rockwell Sabreliner 50
Rockwell Sabreliner 60
Rockwell Sabreliner 65
Shorts Skyvan SC7-3-1
Shorts Skyvan SC7-3-2
Shorts Skyvan SC7-3A-1
Shorts 330-100 Series
Shorts 330-200 Series
Shorts 360-200 Series
Shorts 360-300 Series
Shorts SC.5 Belfast
Cirrus SR20
Cirrus SR22
Ryan ST3KR
Raytheon Starship 2000
Aero Spacelines Super Guppy
Ayres Turbo Thrush T-65
EADS Socata TBM-700
EADS Socata TB-20 Trinidad
Tupolev Tu-330
Martin WB-57F Canberra
Harbin Y-12
Yakovlev 40 Codling
NAMC YS-11A-200 Series
NAMC YS-11A-300 Series
NAMC YS-11A-400 Series
NAMC YS-11A-500 Series
NAMC YS-11A-600 Series
NAMC YS-11A-700 Series
Xian Yunshuji Y-7
Agusta A-109
Boelkow BO-105
Hughes 500D
Sikorsky S-76 Spirit

Appendix B. New Engines

The following list shows the 69 engines that are new in EDMS 5.0. Refer to the system tables located in SYS_DATA\Fleet\Emissions for more information on these engines.

501 D13 alternative 1	PT6A-61	TPE331-10N
501 D13 alternative 2	PT6A-62	TPE331-10R
AI-24VT	PT6A-64	TPE331-10U
CF34-10E	PT6A-65AG	TPE331-10UA
CT7-5A2	PT6A-66	TPE331-10UG
CT7-9B	PT6A-67	TPE331-10UK
DART 514	PT6A-67A	TPE331-11U-601G
DART 552	PT6A-67AF	TPE331-12B
GP727X	PT6A-67AG	TPE331-12UA
GP7XXX	PT6A-67CF	TPE331-12UHR
PT6A-11	PT6A-67R	TPE331-14B
PT6A-110	PT6A-68	TPE331-14GR
PT6A-112	PW121A	TPE331-15AW
PT6A-114A	PW127	TPE331-1UA
PT6A-121	PW127B	TPE331-2UA
PT6A-135A	PW127D	TPE331-3U
PT6A-15AG	PW127G	TPE331-3W
PT6A-21	PW150A	TPE331-5A
PT6A-25C	T56-A-14	TPE331-5B
PT6A-38	TPE331-1	TPE331-6
PT6A-40	TPE331-10A	Trent 970-84
PT6A-45AG	TPE331-10G	TRENT97X
PT6A-45B	TPE331-10GT	TRENT9XX